REMARKS

Claims 13, 17, 19, 23, 26, 29, 31, 33, and 34 are pending. Claims 13, 17, 19, 23, 26, 29, 31, 33, and 34 are rejected under 35 USC 103(a) as being unpatentable over Burgess (US 5,805,896), in view of Sakurai et al. (US 6,334,076), in view of Kroeger (US 2002/0165723), and further in view of Elmqvist ("A Uniform Architecture for Distributed Automation", Advances in Instrumentation and Control, Instrument Society of America, Research Triangle Park, NC US, Vol. 46, Part 2, 1991, Pages 1599-1608).

Claims 13-26 and 33 are amended as supported in paragraph 22, lines 4-7, and paragraph 34, lines 2-3. No new material is added. Applicants' paragraph numbers mentioned herein are relative to the substitute specification.

Response to rejections under 35 USC 103(a)

Examiner asserts in paragraph 3 of the Office Action that directed relationships of components are defined in Burgess col. 3, lines 29-34, lines 54-57, and col. 4, lines 1-16. These lines describe visual programming as illustrated in FIG 4, in which a programmer graphically configures the directed relationships. However, nothing prevents a reversal of the C-to-F and F-to-C calculator objects by the visual programmer, which would produce incorrect relationships.

> Burgess col. 3, lines 21-38: FIG. 4 is a diagram illustrating visual programming of the present invention. To generate a visual program to implement a temperature converter, a programmer would position a Fahrenheit scroll bar 401, a Fahrenheit display 430, a Centigrade scroll bar 420, and a Centigrade display 440. The programmer would also position an FtoC calculator 460, which converts a Fahrenheit value to a Centigrade value, and a CtoF calculator 450, which converts a Centigrade value to a Fahrenheit value. In one embodiment, the components are selected from an extendible list of available components. The programmer then connects the components through their ports. The connections 412->461 and 412->431 indicate that when the Fahrenheit scroll bar is changed (e.g., slider moved), the new value is sent to the FtoC calculator and the Fahrenheit display. The connection 462->421 indicates that when the FtoC calculator calculates a new Centigrade value, the new value is sent to the Centigrade scroll bar.

In contrast, Applicants' directed relationships are already contained in a description of each component, constraining the connections to a proper order by allowing fewer degrees of freedom in order to reduce the possibility of error.

> Applicants' paragraph 10, lines 1-3: "In the system according to the invention data continuity is achieved in that control-relevant information is already contained in a description."
>
> Applicants' paragraph 20, lines 13-18: "The information already contained in the description 1 is used to allocate input and output information to the ports. The predecessor-successor relationships between the components are governed by this information, i.e. who sends data to whom via which data input is defined thereby."

This prevents incorrect relationships that are possible in Burgess, because the predecessor-successor relationships are defined prior to local plant automation programming.

> Applicants' paragraph 21: "On the basis of the metainformation, the components 2 are connected to one another by automated means. Particular connections between the components 2 can only be implemented if this is permitted by the constraints described in the metainformation. Automated "wiring" of the components 2, and therefore automatic generation of automation code, are therefore effected."

Applicants reduce freedom in order to reduce complexity in automation programming, because incorrect options are eliminated from consideration. Continuity of expert information and earlier know-how guides and limits the plant automation code developer.

> Applicants' paragraph 22, all lines: "The work of the development engineer is greatly facilitated thereby, since fewer degrees of freedom exist as a result of the definition of the metainformation, reducing the possibilities of error. In addition, a continuous information flow is ensured, reducing the loss of already established know-how during the development of the automation system."
>
> Applicants' paragraph 34, lines 2-3: automation code is generated on the basis of existing descriptions 1 of a plant structure.

The above deficiency in Burgess is not satisfied by Sakurai or Elmqvist.

Examiner asserts that Elmqvist supplies the claimed feature of drawings with control-relevant information based on material flow in a processing plant, because it is inherent that the

physical objects of the plant form the path for the material or fluid flow as shown in the example of the tank system (figures 1-5). However, as in Burgess, this tank system layout only exists after the visual designer has selected the graphic components and placed them in this order. These graphical components do not have predecessor/successor descriptions stored in them to require an order based on a material flow and prevent mistakes. Instead, the design module definitions of Elmqvist are purely hierarchical (FIG 2). The first line under VISUALIZATION on page 1605 states: "The complete picture, as seen in a window, is a hierarchical picture according to the module hierarchy." The two tanks of FIG 1 are just instantiations of the same "tank" object. Thus their order in FIG 1 could be reversed -- the same kind of mistake discussed for Burger above. It so happens that this reversal would not make a difference in FIG 1 of Elmqvist, but only because FIG 1 is too simple an example to illustrate an ordered relationship. The examples of Elmqvist and Burgess are both highly simplified, but at least the example of Burgess can be used to show how order is important, which is the case in a manufacturing or processing plant.

Kroeger provides a construction project and document management system -- not a system for generating manufacturing plant automation code. This is a very different field. Kroeger does not produce plant automation code. Furthermore, Kroger manages construction operations, which are done by human teams and subcontractors, and are very changeable. Anyone who has been involved in a construction project knows that time-tables and the order of events is constantly changing, depending on delays by subcontractors, bad weather, supply shortages, emergency reconstruction elsewhere, etc. Although it is surely useful to have a system to coordinate construction projects, such a system does not apply to the present invention. Furthermore, Kroger does not provide a CAD drawing of the construction process. The closest thing to a graphical user interface is FIGs 7 and 8, which show a textual menu-driven screen. Kroger is not compatible with the present invention, because too much flexibility is required in construction projects to allow for definition of standard components with pre-defined predecessor/successor relationships. Kroger must accommodate constant revision, mistakes, corrections, re-engineering, and even improvisation. This would defeat the purpose of the present invention, which is to eliminate such flexibility to avoid mistakes in plant automation

code. Thus, Kroeger teaches away from the present invention and cannot be combined with Burgess to produce it.

> Kroger, par. 113 lines 1-2: As set forth hereinabove, tasks may be edited/added at any time by authorized contacts.

Conclusion

The proposed combination of Burger, Sakurai, Kroeger, and Elmqvist does not teach or suggest certain features of the present invention claimed in the independent claims, as argued above. These features provide major benefits in safety and continuity of plant automation design and code generation over the prior art. Furthermore, Kroeger is in a different field, and teaches away from the present invention, as argued above. Therefore, Applicant respectfully requests withdrawal of the 35 USC 103 rejections, and allowance of the present application.

The commissioner is hereby authorized to charge any appropriate fees due in connection with this paper, including the fees specified in 37 C.F.R. §§ 1.16 (c), 1.17(a)(1) and 1.20(d), or credit any overpayments to Deposit Account No. 19-2179.

Respectfully submitted,

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By: _____

John P. Musone
Registration No. 44,961
(407) 736-6449

Siemens Corporation
Intellectual Property Department
170 Wood Avenue South
Iselin, New Jersey 08830